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ABSTRACT

Industrial maintenance in Northeast Georgia is facing an acute crisis. Contributing factors are economic development that is depleting the work force, aging of the population, downsizing of the military, and lack of technical school graduates. Solutions to the crisis fall into three categories: short-term, mid-term, and long-term. For short-term solutions, Athens Area Technical Institute concentrates on improving the efficiency and effectiveness of existing maintenance staff, total productive maintenance, and tools to predict equipment failure and eliminate unscheduled downtime. Creating a learning organization within the company is the mid-term solution used by Athens Tech. A cross-trained or multicrafted maintenance staff reduces the need for additional maintenance staffing. The long-term solution is to develop future staffing--a solution which can require up to 4 years to train a multicraft maintenance technician. One area company, ABB Power T&D, has worked with Athens Tech to develop a model for providing for future maintenance staff needs. The project is designed to provide for future maintenance staff openings and upgrading and cross-training existing maintenance staff. A trainee program will provide 10 multicraft maintenance staff to cover retirements and provide for future growth. Existing staff receives 4 hours per week of onsite classroom training. Other solutions for providing long-term maintenance staffing include apprenticeship, cooperative education, and school-to-work programs. (YLB)

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ED 408 434

Maintenance Crisis vs Solutions

By: Susie Haggard, Manager Business and Industry Services, Athens Area Technical Institute

Background

Industrial Maintenance in Northeast Georgia is facing an acute crisis. Economic development in the South, and particularly the Northeast Georgia Region, for the last ten years has been excellent and is expected to continue. According to a recent article in the Atlanta Journal-Constitution's 1997 Southern Economic Forecast, the projected job growth rate for Georgia will be 2.2% while the rest of the nation will increase only 1.7%. Low unemployment rates and lack of skill workers have helped make the region—especially Georgia—the fastest growing area in the country says Jeffrey Humphreys, director of economic forecasting for the University of Georgia in the same article. The employment rate for Athens-Clarke County hovers at 2.9% while the surrounding counties have about 3% according to a recent article in the Athens Banner Herald. This strong economic development has depleted the workforce whether skilled or unskilled.

The second factor contributing to the crisis is the aging of the population in general and the industrial workforce in particular. Industrial Maintenance is effected by this aging with staff members retiring and taking both equipment knowledge and experience with them.
The downsizing, right sizing, reengineering of middle management—cutting costs by reducing the number of employees—is one of the most prevalent strategies of the '90's according to American Demographics, February of 1997. This downsizing, it argues, has had several unexpected consequences one of which has been to reduce industrial engineering, manufacturing engineering, maintenance supervision, stores management, and even maintenance planning further robbing industrial maintenance of valuable resources which supplement both skills and experience needed to maintain complex equipment in the industrial or manufacturing environment.

The downsizing of the United States military has played a profound but indirect role. Traditionally, young people finishing military service supplied a ready pool of maintenance or technically trained workforce available to industry and manufacturing. With the reduction in the military, this pool is no longer available.

The last and possibly the most significant factor is the lack technical school graduates available in sufficient numbers to meet the needs of industry and manufacturing. The philosophy of sending the best and brightest students to college, and regarding technical education as an alternative to those not able to get into college is the key. Attracting students into industrial maintenance has been difficult because many either do not know industrial maintenance jobs exist, or regard industrial maintenance as low paying, dirty, dangerous and lacking prestige.

To further complicate the situation, computer-aided and Just-In-Time manufacturing concepts, International Quality standards, and multi-crafting require higher skills of the existing industrial maintenance workforce.

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Vision

The Vision of Athens Area Technical Institute's Office of Business and Industry Services is dedicated to the goal of zero unplanned machine downtime in all manufacturing companies in the 12-county service area in Northeast Georgia. To support this vision, we:

- Dedicate a training development facility
- Provide a think tank for site-specific, systems-oriented solutions
- Provide classroom instruction
- Provide hands-on maintenance skills testing
- Do all necessary to remove barriers to 100% machine up-time
- Involve customers in all that we do

Athens Area Technical Institute, working with the over 300 business, is developing or discovering solutions to the crisis which threatens industrial maintenance and therefore American industry.

The solutions fall into three categories: short term, mid term and long term solutions.

Short Term

Many companies need immediate solutions to improve their survival positions. For short term or immediate solution, Athens Tech concentrates on improving the efficiency and effectiveness of the existing maintenance staff within an organization. Why improve the effectiveness? The maintenance organization in a reactive or "fire fighting" mode requires more staff. The staffing must be adequate to handle the peak maintenance need. Maintenance Management Systems can improve maintenance staff efficiency by looking at the Fundamentals of Maintenance. Is there a preventative maintenance systems which can eliminate downtime by preventing machine breakage. Is the stores and purchasing function stocking needed parts in the right amounts at the right time. Is there a work order and planning activity in place so that maintenance activities can be performed in a controlled and orderly manner. Is there a Computerized Maintenance Management system to generate data in order to analyze chronic break downs and to move toward a Predictive maintenance.

Total Productive Maintenance is often employed as part of the overall business strategy. Total Productive Maintenance (TPM) teaches everyone within the organization to focus on improving overall equipment efficiency. TPM teaches the basics of maintenance such as Maintenance Management Systems. Then, TPM encourages the development of problem solving teams to improve the run time. In addition, TPM involves operators in the maintenance of their equipment and TPM emphasizes training. Athens Tech offers at least two, 2-day workshops for TPM each year. Companies involved or implementing TPM are supported by a network of companies which meet twice each year at Athens Tech or a company site.

The final short term solution which Athens Tech employs is Leveraging Technology: Tribology, Vibration Analysis, Infrared Thremograply, Laser Alignment, Balancing and Motor Monitoring are all tools which allow an organization to move into predicting equipment failure and eliminating unscheduled downtime. Control of unscheduled downtime reduces the need for

additional staffing in a maintenance group.

Mid-Term

Creating a learning organization within the company is the mid-term solution employed by Athens Tech as a solution. A cross-trained or multi-crafted maintenance staff reduces the need for additional maintenance staffing. Multi-crafting or cross-training maintenance technicians eliminates the duplication of both electrical or mechanical staff. Diagnosis of machine failure is quicker and more accurate if technicians are cross-trained. Root causes analysis is a tool which eliminates the need to correct a mechanical failure more than once. Maintenance staff members learn not simply to repair machine failure but to trace the failure to the root cause and then eliminate the cause. Pay-for-skill progression systems establish a clear path for increasing the skill of a maintenance staff and offers an incentive for those who improve their skills. A task analysis of each job within the scope of the maintenance department must first be performed to avoid overlooking any element of the maintenance jobs. The task analysis can serve as the basis for developing an assessment of skills, or as a training document to ensure that on-the-job training is consistent. A task analysis lists the difficulty and frequency of each task. Then, the task analysis can be used to document skills for each maintenance staff member or trainee as they are demonstrated. One final element of a learning organization is the identification and training of peers trainers. The peer trainers are key individuals within an organization who posses special knowledge or skills. These peer trainers should receive Structured On-The-Job training to standardize the training methodology. The peer trainers perpetuate training on-the-job. All these are steps to creating a maintenance learning organization.

Long Range

Finally when maintenance staff is not available within the area, alternate methods must be used to develop future staffing. In other words "growing your own maintenance workforce." This is a long term solution since it can require up to four years to train a multi-craft maintenance technician. However, one area company, ABB Power T&D has worked with Athens Tech to develop a model for providing for future maintenance staff needs. The ABB project is designed to provide for future maintenance staff openings as well as up-grading and cross-training existing maintenance staff.

ABB is a Swiss owned producer of pole mounted transformers in Athens, Georgia. The Athens plant was built in 1957 and was owned by Westinghouse until 1992. The plant employees 770 with a maintenance staff of 37. The plant is a union shop. Until 1995, the maintenance function had 8 different maintenance job classifications. There are presently only two job classification: mechanic and electro-mechanic.

Over the next two years, 25% of the maintenance staff is eligible to retire. The trainee program will provide 10 multi-craft maintenance staff to cover the retirements and provide for future growth. The trainees were selected from the production staff by a committee which was comprised of management, maintenance staff and union representatives. Most have some prior mechanical experience or training, and all have been production employees of ABB for more than 5 years. Athens Tech provides 8 hours per week of on-site classroom training. The remaining 32-hours are spent with peer trainers on-the-job. A task analysis was done of all maintenance jobs,

and these serve as the training documents used to ensure each trainee receives consistent on-the-job training. Peer trainers have received Structured On-The-Job training for consistent methodology.

The existing maintenance staff receives 4 hours per week of classroom training which is provided on-site by Athens Tech. Each staff member has been assessed in both electrical and mechanical areas to determine present skill using the Maintenance Assessment developed at Athens Tech and funded by Georgia-Pacific. A training prescription was written for each of the maintenance staff and training is being provided to fill the skill gap of each individual. The maintenance staff will be cross-trained or multi-craft. The program at ABB began approximately two years ago and is a four year project.

Other

Other solutions for providing for maintenance staffing long term include Apprenticeship programs, Co-op programs, and school to work programs.

Summary

In theory, solutions to the maintenance crisis abound. In reality, many of the solutions require time and expertise to implement. Truly each situation is unique, and the solution must be tailored to the company's unique needs. Donald Ratajczk, director of the Economic Forecasting Center at Georgia State University, notes that, "In the past, the south has relied on importing talent from elsewhere—but as economic activity strengthens in other parts of the nation, this method of sustaining growth no longer works." Mr. Ratajczk further states, "For this region to be assured growth in the next decade, it must develop people who already live here." Maintenance skills must be improved, and more maintenance technicians must be available for the future.